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ABSTRACT

Vocabulary diversity is a measure either of the language spoken within a fixed time period or of the total utterances, sentences, or words. To measure children's language development as revealed by the diversity of their spoken expression, a comparison was made of the vocabulary of 15 first-grade children of average ability, of first-grade primers from one of 15 basal reader series, and of 15 first-grade trade books. Vocabulary diversity was determined by both the type-token ratio--in which the number of different words found in a sample is divided by the total number of words in the sample--and by the number of words used only once within each sample. All samples were approximately 500 words. Oral, primer, and tradebook language samples were computer analyzed for calculating the type-token ratios. For each sample among the three vocabularies, 15 type-token ratios were calculated and used for analysis of variance. Findings showed greater diversity in children's vocabularies than in the primers' samples, with no significant difference between oral and trade book vocabularies. References, a sample questionnaire, and tables are included. (JM)

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A COMPARATIVE STUDY OF VOCABULARY DIVERSITY: THE SPEAKING VOCABULARIES OF FIRST-GRADE CHILDREN, THE VOCABULARIES OF SELECTED FIRST-GRADE PRIMERS, AND THE VOCABULARIES OF SELECTED FIRST-GRADE TRADE BOOKS

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One of the major aspects of language is vocabulary. Vocabulary may even be considered the most important aspect of language since the words which make up a vocabulary provide the component parts of a language.

A measure of vocabulary is the degree to which the vocabulary items, the words, vary within certain boundaries such as the language spoken within a fixed period of time, for example, or a language sample of a certain size in terms of total utterances, sentences, or words; this measure of vocabulary variation is often called vocabulary diversity.

A measure of the language development of children is the vocabulary diversity of their expressive language. While expressive vocabularies

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include both speaking and writing, a better index of competence in expression is obtained when speaking rather than writing vocabularies are measured, since some children--especially young children--lack extensive writing skills.

As a child learns his language his vocabulary grows; it becomes more diverse. As a child learns to read he becomes able to accomodate the increasingly diverse vocabularies contained in basal readers and trade books.

Objectives

The objectives of this study were to compare the vocabularies of 1) first-grade children (speaking), 2) first-grade primers, and 3) first-grade trade books. It was hypothesized that the childrens' oral vocabularies would be more diverse than the vocabularies contained in the primers or the trade books. Specific questions to be answered by this investigation were as follows:

1. To what extent are the speaking vocabularies of first-grade children more or less diverse than the vocabularies used in basal primers?
2. To what extent are the speaking vocabularies of first-grade children more or less diverse than the vocabularies used in trade books?
3. To what extent are the words contained in the vocabularies of the primers and trade books also contained in the speaking vocabularies of first-grade children?

It is assumed that knowledge of a close match, or some indication of the extent of the diversity among the vocabularies measured in this

study would be beneficial in planning initial reading programs and selecting instructional materials for beginners.

Theoretical Framework

The first meaningful word is uttered by the child usually at the tenth, eleventh, or twelfth month of his life (Smith, 1926; McCarthy, 1954). By the time the child has reached five years of age, his speaking vocabulary has grown to approximately 2000 words (McCarthy, 1954). By the time the child begins reading instruction in grade one his speaking vocabulary exceeds 3000 words (Templin, 1957; McCarthy, 1954) and it may even approach as many as 15,000 different words (Smith, 1941). It appears that even the most disadvantaged of inner-city children have extensive speaking vocabularies upon entrance to grade one (Sherk, 1973).

The vocabulary of the typical first-grade basal reading program published in the 1940s, 1950s, and 1960s, contained approximately 350 different words with the words introduced gradually and repeated often. Typical publishers of such programs were Harper and Row (1966), Houghton Mifflin (1966), and Macmillan (1965) who introduced twenty, twenty, and twenty-three words respectively in the first preprimer (Moe, 1971). Second and third preprimers of a series each contained about twenty-two new words with the primer presenting approximately one hundred new words (Pescosolido, Schell, and Laurent; 1967). This use of a relatively few words, repeated often, has been typical of basal readers employing the use of a controlled or pre-determined vocabulary.

The use of the controlled vocabulary, however, is a relatively recent phenomenon and there is evidence that prior to the 1920s the vocabulary contained in reading materials was relatively uncontrolled (Burton, 1956; Russell, 1961).

Interestingly, publishers have recently (1970s) decreased the vocabulary controls somewhat with one one publisher (Scott, Foresman, 1971), at least, advertising that their materials have been written with no vocabulary controls. It appears, however, that if publishers have decreased vocabulary control, such changes have been minor.

Most authors of children's trade books--even those intended for the very young child--have never admitted to writing their books with a predetermined vocabulary. And with the exception of a relatively few books (Dr. Seuss books, for example) the vocabularies contained within trade books for young children have been quite diverse. Indeed, some authors of children's trade books seem to strive for diversity and complexity.[1]

Critics of the controlled-vocabulary basals have long contended that the language was stilted and uninteresting and the trade books were generally more appealing to young children. As to what the proper balance should be between the speaking vocabulaires of the first-grade child and the vocabularies contained in the published materials to be read by such a child, the problem is unresolved.

Methods

Vocabulary diversity was determined in this study through the use of a type-token ratio (Carroll, 1964) where the number of different words found in a sample is divided by the total number of words contained in the sample. Also used as a measure of vocabulary diversity were the number of words used only once within each sample. All samples were of approximately 500 words; samples ended with the last word in the sentence or utterance in which the 500th word was counted.

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[1] Note for example, the vocabulary used by Leo Politi or the sentence structure used by Judith Viorst.

Oral language samples were obtained through the use of a semi-structured sampling technique where students were asked to respond to several open-ended questions. For the specific protocol used, see the attached "Directions for obtaining oral language samples from young children." All oral language samples were recorded by cassette recorders and later transcribed for data analysis.

The written language samples were obtained by taking a sample of approximately 250 words from the middle of the first half and the middle of the second half (the one-quarter and three-quarter points) of each of the primers and trade books.

The oral language samples, the language samples from the primers, and the language samples from the trade books were keypunched for computer analysis which employed the use of a computer program previously used in language analysis by McDaniel and Moe (1973), Moe (1973), and Moe and Arnold (1973). The computer printouts provided the necessary information for calculating the type-token ratios and also provided a sorted list of words based on frequency of occurrence.

Words common to the three vocabularies were also identified and compared.

Data Sources

Fifteen first-grade children (eight boys and seven girls) provided the oral language samples. The students were obtained from three school districts with all the schools being located in middle-class socio-economic status areas. Students included in the study were identified by their respective teachers as being students of average ability and achievement. The mean age of the students at the time of data collection

was six years eleven months with a range of from six years four months to seven years four months.

The primers from which the samples were taken were part of one of the fifteen published basal reader series. The publishers of the series were Allyn and Bacon (1968), American Book Company (1971), Bank Street Readers (Macmillan, 1965), Economy (1972), Ginn (1969), Harcourt, Brace and World (1970), Harper and Row (1972), Holt, Rinehart and Winston (1973), Houghton Mifflin (1971), Lippincott (1969), Lyons and Carnahan (1972), Macmillan (1970), Open Court (1970), Scott, Foresman (1971), and Science Research Associates (1970). In the instances where the primer was not identified by the publisher, the next-to-the-last book in the first-grade program was selected.

With the exception of four more recently published books, the fifteen trade books from which samples were taken in this study were selected from among a list of 110 widely used trade books which had been used in a previous study (Moe, 1973). The titles of the fifteen trade books were And to Think That I Saw It on Mulberry Street, The Biggest Bear, Chanticleer and the Fox, Dandelion, Duffy and the Devil, Finders Keepers, Harold and the Purple Crayon, Ira Sleeps Over, Make Way for Ducklings, Mike Mulligan and His Steam Shovel, Moon Mouse, Millions of Cats, One Fine Day, Sleep Out, and White Snow Bright Snow.

Data Analysis

Each sample was analyzed separately so that descriptive information for each sample would be available. Some of the descriptive statistics obtained when the samples were analyzed separately provided the data for subsequent analyses where the three vocabularies were compared to deter

mine if there were significant differences among the three groups.

Fifteen type-token ratios were calculated, one for each sample among the three types of vocabularies. These ratios were then used in a one-way, equal cell analysis of variance. Fifteen figures representing the number of words used only once for each of the samples within the three types of vocabularies were also used in a one-way, equal cell analysis of variance. The somewhat conservative Tukey Honestly Significant Difference analysis of variance procedure was used. Paired contrasts between the oral language mean and each of the other two means was also conducted.

Findings

A considerable amount of descriptive information was obtained in this study much of which is summarized in Tables I through X. Table I provides the descriptive information on the type-token ratios for each of the three vocabularies with the smallest mean, .269, found in the primer samples and the largest mean, .416, found in the trade books samples. The standard deviation of the type-token ratios for the oral language samples was the smallest, indicating less deviation than among the written language samples.

Table II indicates that there were considerably fewer words used once in the primer samples with a mean of 48 than in the oral samples with a mean of 116 or the trade book samples with a mean of 132. Again, the least deviation was found among the oral language samples.

Tables I and II about here

Since the vocabularies investigated represent three important vocabularies for educators, a rather thorough description of each is presented here.

When all fifteen oral language samples were pooled, the combined analysis indicated that 7,568 total words and 1,183 different words were used. The 100 most frequently used words in the oral samples accounted for 64% of the total words used. Those words are listed according to their frequency of occurrence in Table III.

Fifty-six words were common to at least ten of the fifteen oral language samples. Those words are also listed according to their frequency of occurrence and are found in Table IV.

Tables III and IV about here

When all fifteen primer samples were pooled, the combined analysis indicated that 7,533 total words and 738 different words were used. The 100 most frequently used words in the primer samples accounted for 67% of the total words used. Those words are listed according to their frequency of occurrence in Table V.

Fifty words were found to be common to at least ten of the fifteen primer samples. Those 50 words are listed according to their frequency of occurrence in Table VI.

Tables V and VI about here

The combined analysis of all fifteen trade book samples revealed that 7,539 total words and 1,536 different words were used. The most

frequently used 100 words in the trade book samples accounted for 56% of the total words used. Those words are listed according to their frequency of occurrence in Table VII.

Forty-six words were found to be common to at least ten of the fifteen trade book samples. Those 46 words are listed according to their frequency of occurrence in Table VIII.

Tables VII and VIII about here

A comparison of the oral and primer vocabularies indicates that of the 1,183 different words used in the combined oral samples and the 738 different words used in the combined primer samples, 379 words were common to both vocabularies. If inflected forms of a word are considered as being the same word, however, the oral and primer vocabularies would have an additional 75 words in common. A summary of the degree to which the oral and primer vocabularies overlap, is presented in Table IX.

Table IX about here

A comparison of the oral and trade books vocabularies shows that of the 1,183 different words used in the combined oral samples and the 1,536 different words used in the combined trade book samples, 515 words were common to both vocabularies. And if inflected forms are added, the oral and trade book vocabularies would have an additional 191 words in common. The degree to which the oral and trade book vocabularies overlap, is summarized in Table X.

Table X about here

In testing for significant differences in the means of the three vocabularies for the type-token ratios and the number of words used once, an alpha level of .05 was set. The analysis of variance on the type-token rations yielded a significant F value ($p < .001$) of 21.07 which far exceeded the critical value of 3.43 necessary for significence. The analysis of variance on the words used once indicated a significant F value ($p < .001$) of 24.21 which also far exceeded the critical value of 3.43 necessary for significance.

A comparison of the oral language means and the primer means revealed a t value of 5.11 for the type-token ratios and a t value of 5.29 for the number of words used once; both t values were significant at the .001 level.

A comparison of the oral language means and the trade book means indicated a t value of .92 for the type-token ratios and a t value of 1.27 for the number of words used once; neither of those t values was significant.

It was apparant that the significance found in the analysis of variance was bacause the primer vocabulary means (Table I and II) were considerably lower than the oral or trade book vocabulary means.

Conclusions

The vocabularies of the children samples in this study reflected much more diversity than the primers samples. The type-token ratios, the number of words used once, and the total number of different words found in the combined oral samples all indicate a diversity in oral vocabulary that greatly exceeds the primer vocabularies. To those familiar with the language of children and the language of primers, this finding was not unexpected.

The extent to which the oral and primer vocabularies share words in common was rather small with only 379 words common to both vocabularies.

In this study of limited sample sizes, it appears that the chance of finding vocabulary items common to many oral or primer samples is relatively small.

Although the trade book means were greater than the oral language means for type-token ratios and the number of words used once, the differences were not significant. There were, however, over 350 more different words used in the combined trade book samples than in the oral language samples. Had a less structured oral language sampling technique been used, however, the diversity of the oral language vocabulary may have been greater.

The fact that the vocabulary was more diverse in the trade books examined suggests that some caution should be used in the selection of trade books for first-grade readers.

While there was no significant difference found between the oral and trade book vocabularies as determined by type-token ratios and the number of words used once, this lack of difference refers only to the relative variation of the vocabulary items, the words, within each vocabulary (oral and trade book) and this lack of difference does not mean that the two vocabularies necessarily share common words; in fact, they share relatively few words.

Actually, the lack of overlap between the oral and trade book vocabularies is rather surprising. When one compares the words common to ten of the fifteen oral language samples, ten of the fifteen trade book samples, the most frequently used 100 words found in the oral language samples, and the most frequently used 100 words found in the trade book samples (words common to Tables III, IV, VII, and VIII) one finds only 32 words in common. Those 32 words are so frequently used that they (a, all, and, at, but, do, down, had, have, he, him, his, I, in, is, it,

little, of, on, said, that, the, there, they, this, to, up, was, went, when, with, and you) should be considered essential beginning reading words and introduced early in the beginning reading program.

Since the most frequently used 100 words found in each vocabulary represent such a high percentage of the total words used in the respective vocabularies, those words (contained in Tables III, VI, and VIII) may be considered important words for beginning readers. It should be emphasized, however, that the words contained in Table III are the most important since they are words used by the children. The words found in Table VII are important because they are necessary in order to read the trade books sampled in this study. The primer words contained in Table V are important only insofar as they are found in the oral vocabularies of children and in the literature for children.

Caution must be expressed to those who would make extensive use of the word lists provided here since better lists--based on more and sometimes larger language samples--are available.

This investigation shows that in terms of vocabulary diversity, the oral and trade book vocabularies sampled are comparable, with the trade books samples showing a greater, though not significantly greater, diversity than the oral samples. The oral vocabularies, however, were found to be significantly superior to the primer samples in all measures of diversity.

It is hoped that the results of this study will be helpful to those interested in the language of children and to those who must devise or select materials for beginning readers.

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Alden J. Moe

DIRECTIONS FOR OBTAINING ORAL LANGUAGE SAMPLES FROM YOUNG CHILDREN

Child's Name_____ Grade____ School_____

Date of birth_____ Date or sampling_____

Introduction Make the child feel at ease and comfortable. You might discuss some aspect of the child's school or classroom. Be sure to tell the child your name and that you simply want to talk for a little while.

Use of picture Prior to the time you ask the child to tell you what is happening in a picture, the tape recorder should be set up and operating. By using a picture you focus attention away from the tape recorder and yourself. The picture is used simply to help make the child feel more at ease and to get the child started talking. This part of the child's speech will not be analyzed, so if the child becomes very talkative, go to the next task.

Favorite sport or game Data collection actually begins here. Ask the child to identify his favorite sport or game and tell how it is played. Do as little talking as possible except to probe for more talk on the part of the child. For example, you might say "Can you tell me more?" For the child who may give a very short response, you may have to ask about another favorite sport or game. Hopefully, the child will talk for three to five minutes on this subject.

Favorite TV show Ask the child to identify his favorite TV show and to tell what happened on the last show. You may have to ask the child to tell you about another TV show if you feel the response is too short.

Food If you feel the child has provided a sample of at least 500 words, you need not continue. Ask the child what foods he likes to eat most and why. You may ask about specific meals if necessary.

Other topics If you have been unable to obtain a sufficient sample of the child's oral language at this point, you may wish to try other topics of your choice or the child's choice.

Comments After you have collected the sample, please comment on how well you were able to establish rapport with the child, how you might modify the procedures in the future, etc.

TABLE I

DESCRIPTIVE STATISTICS ON THE TYPE-TOKEN RATIOS

Vocabulary	Mean	St. Dev.	Range
Oral	.394	.038	.323 - .462
Primers	.269	.051	.216 - .420
Trade Books	.416	.097	.210 - .530

TABLE II

DESCRIPTIVE STATISTICS ON THE WORDS USED ONCE

FOR EACH OF THE THREE VOCABULARIES

Vocabulary	Mean	St. Dev.	Range
Oral	116	18	77 - 150
Primers	48	25	23 - 123
Trade Books	132	52	31 - 207

TABLE III

ONE HUNDRED WORDS OF HIGHEST FREQUENCY AS FOUND

IN THE COMBINED ORAL LANGUAGE SAMPLES

and	don't	at	going
the	go	make	house
a	know	me	time
I	up	or	her
to	when	put	over
it	had	something	because
you	that's	things	team
he	uhm	dog	what
like	but	do	brother
in	his	around	off
my	with	down	somebody
of	well	is	want
they	it's	so	bat
that	went	mom	remember
she	some	just	sometimes
all	other	think	after
on	can't	can	he's
have	him	stuff	no
was	if	our	two
then	said	about	three
wet	there	watch	dad
one	this	too	goes
got	little	see	I'm
them	out	cause	take
get	play[1]	home	ball[2]

[1] Words up to this point account for 53% of all the words used.

[2] Words up to this point account for 64% of all the words used.

TABLE IV

WORDS COMMON TO TEN OF THE FIFTEEN ORAL LANGUAGE SAMPLES

RANKED ACCORDING TO FREQUENCY OF OCCURRENCE

and	one	there
the	got	this
a	them	little
I	get	out
to	don't	play
it	go	at
you	up	me
he	when	or
like	had	put
in	that's	do
my	but	down
of	his	is
they	with	can
that	it's	about
all	went	watch
on	some	home
have	other	
was	can't	
then	him	
we	said	

TABLE V

THE ONE HUNDRED WORDS OF HIGHEST FREQUENCY

AS FOUND IN THE COMBINED PRIMER SAMPLES

the	but	then	stop
said	his	up	ride
to	at	out	away
and	they	play	David
I	what	too	cat
a	me	pulled	day
he	that	here	got
you	saw	something	her
it	come	want	don't
in	see	Mr.	good
will	went	this	Patty
is	all	into	let
on	we	him	so
can	one	old	back
do	of	boy	ran
have	big	had	girls
she	like	as	sat
was	now	put	work
not	look	my	boys
man	down	red	children
little	did	know	frog
get	box	some	yes
go	are	came	Jack
for	mother	looked	fast[2]
with	Ted[1]	dog	made

[1] Words up to this point account for 52% of all the words used.

[2] Words up to this point account for 67% of all the words used.

TABLE VI

WORDS COMMON TO TEN OF THE FIFTEEN PRIMER SAMPLES

RANKED ACCORDING TO FREQUENCY OF OCCURRENCE

the	said	then
said	get	up
to	go	too
and	for	want
I	with	had
a	but	my
he	his	some
you	at	came
it	they	day
in	what	back
will	me	
is	come	
on	see	
can	went	
do	of	
have	big	
she	like	
was	now	
not	did	
man	are	

TABLE VII

THE ONE HUNDRED WORDS OF HIGHEST FREQUENCY

AS FOUND IN THE COMBINED TRADE BOOK SAMPLES

the	very	me	mother
and	what	her	into
a	at	made	after
to	old	bone	something
he	up	about	Christopher
of	as	little	thought
his	there	moon	where
it	one	way	place
I	down	I'll	Teddy
in	out	now	back
said	get	no	nap
was	she	this	tail
that	do	Reggie	woman
they	give	Johnny	man
on	have	think	your
you	big	some	go
for	when	like	not
so	see	looked	long
is	be	from	if
had	just	saw	over
all	bear	can	take
but	were	by	street
with	went	asked	Dandelion
him	could	came	water
my	then[1]	would	too[2]

[1]Words up to this point account for 46% of all the words used.

[2]Words up to this point account for 56% of all the words used.

TABLE VIII

WORDS COMMON TO TEN OF THE FIFTEEN TRADE BOOK SAMPLES

RANKED ACCORDING TO FREQUENCY OF OCCURRENCE

the	all	could
and	but	little
a	with	now
to	him	no
he	what	this
of	at	looked
his	up	
it	as	
I	there	
in	one	
said	down	
was	out	
that	do	
they	have	
on	when	
you	see	
for	be	
so	just	
is	were	
had	went	

TABLE IX

THE DEGREE TO WHICH THE

ORAL AND PRIMER VOCABULARIES SHARE COMMON WORDS

No. different words in oral vocabulary	No. different words in primer vocabulary	No. words common to oral and primer vocabularies	No. words in oral vocab., but not primer	No. words in primer vocab., but not oral
1,183	738	379	804	359

TABLE X

THE DEGREE TO WHICH THE

ORAL AND TRADE BOOK VOCABULARIES SHARE COMMON WORDS

No. different words in oral vocabulary	No. different words in trade book vocabulary	No. words common oral and trade book vocabularies	No. words in oral vocab., but not trade books	No. words in trade book vocab., but not oral
1,183	1,536	515	668	1,021